HOW TO DEVELOP THE MGC & MGC-GT FOR NORMAL ROAD USE.

This is another revision of a set of articles on developing the MGC-GT written many years ago. A lot of further development has been undertaken since the first set of articles.
This revision: 27 January 2014.

Many articles have been written about what is wrong with the ***'C'*** by comparing the MGC with the MGB. Even today, over 32 years later, motoring journalists (a late '99 article in Classic Cars, UK) still write as they did in 1967, that the problem with the ***'C'*** is the heavy motor that is the problem and it cannot be fixed, end of story. The big Healey had an even heavier version [but mounted further back in the chassis] and didn't get the same comments. One journalist writes a lot of rubbish and following ones simply copy what has been written before.

The School of Automotive Studies at Cranfield (UK) compared an ***MGB*** roadster with an ***MGC*** roadster; using their inertia test rig, supporting the cars under their exact centre of gravity by an air bearing plus springs to enable measurements of roll, pitch and yaw. Their conclusions apart from the ***'C'*** being nose heavy were that the **C's C** of **G** (***Centre of Gravity***) was 14% higher than the ***'B'*** and it's inertia in transverse yaw was 22% higher. So the ***'C'*** is 22% more reluctant to change direction than the ***'B'*** and will roll much more. This helps to explain the terrible understeer on slow downhill mountain corners.

It is the higher **C** of **G** plus the big increase in transverse yaw combined with totally inadequate tyre section and a very weak roll bar plus [on my car as delivered] slight positive camber settings that makes the ***'C'*** such a ***"pig of a car"*** as a sports car; not helped by the unresponsive **LUMP** of **"BEST BRITISH CAST IRON"** (with a flywheel more suitable for a light truck) with a real output in the car of about 120 horsepower.

I thought this pre-amble a good way to start an article on my **'C-GT'** from when I drove it from Dalgety #2 wharf on the 6th of August 1968, up to today when we have a 3 Litre sports car able to keep up with modern traffic and indeed what a big engine ***'B'*** should have been like had Abingdon had the time and money to develop the production car; think how good the **GTS C's** were. It appears that the competition dept. knew all about the shortcomings of the production car and had been in the process of developing stronger Torsion Bars and a faster rack when the racing program was cancelled. [The MGC-GTS cars had an MGB rack with short pinion shaft and universals to clear the crossmember] The "Comp's" dept people apparently never talked to the production people, and 'visa versa' so there was no interaction when the car was being developed.

I will describe the car as it arrived and then what was done by me with helpful suggestions from an experienced designer and engineer [Centaur Sports cars]. As usual with my generation ***"making it go"*** was priority #1 (it couldn't keep up with a mildly tuned 179 EH Holden), we knew handling was more important, but in 68/69 we did not have the knowledge or experience to do anything about that problem; so the motor was first priority. A few years later [after a terrifying experience changing lanes] my mechanical

engineer friend said ***"what that car needs are some decent roll bars front and rear".*** Not understanding this it took until December 93 to actually address what turned out to be the real problem and it transformed the car beyond my expectation. This was followed later by giving the car approx. 1 deg of negative camber and later again fitting 185/65R15 tyres, giving an effective diff ratio about one third way between the early and later cars; effective diff. ratio approx. 3.446:1. (Speedo reads approximately 4.5% high). An MGMotorsport 2.875:1 rack and pinion followed and this gives some feel to the car.

FIRST IMPRESSIONS OF A LONG AWAITED C – GT.

Having had 4 enjoyable years with a 63 ***MK1 B*** it seemed that a ***'C – GT'*** would be a good car as I was going to live in Hong Kong. After settling in I visited Dodwell Motors to order a ***'C – GT'*** with all useful options and was expecting delivery in late 67. As we all found out later this was a period of total and utter confusion at **BMC** as "Triumph" men from Leyland were about to try to promote "Triumph" as the corporate sports car and hope MG would fade away. The terrible bloody STAG was close to release. Many spanners were thrown in the works with the formation of **BLMC**; some thought ***"Bloody Lousy Motor Corporation"*** was what **BLMC** actually stood for.

By the time the car was due to ship I had returned to Australia so the shipping address was changed to Brisbane (Personal Import Plan #4, from memory) so this is how I got my [new from Abingdon with 17 miles on the odometer, on the wharf] ***'C'*** in Australia. Two other used ***"C's"*** were imported about 2 years later, one to Moe in Victoria and the other one to Alice Springs, possibly from SE Asia.

On the 3rd August the ***"SS Auckland Star"*** arrived with my ***'C'*** onboard, deck cargo in those days. I inspected the car on the 5th and took the dry charged batteries to Century Batteries for filling and over night charging, which they did free of charge and I still buy Century Batteries as a result of this excellent service, so next morning armed with my toolbox and 1 Gallon of petrol I picked up my Batteries and headed for the wharf. First step, after installing the batteries and adding fuel, was to remove the plugs and pump up 20 PSI of oil pressure, the motor was tight with only 17 miles on the clock. Then refit the plugs and attempt to start the monster, a few feeble splutters but no go. The plugs were very dirty and oily so out they came, again, and off to the nearest garage (there were garages with real mechanics in 1968) back I went to try again this time 3 cylinders actually tried to run, ah! let's check the SU pistons, 1 piston moved easily, the other didn't move at all. So dismantle the struck SU to discover the jet was not centered and struck against the needle (Quality Control was thought to be some strange foreign concept at **BLMC**) after centering the jet correctly all was well and the motor started and ran easily but with a lot of choke required to keep it going, no wonder the plugs were so fouled.

So after finding all the bits (passenger side wiper blade in with the tools etc.), picking up the spare keys and signing all the shipping forms I had my car. So off to the Public Weighbridge in the Valley then up to **MRD** to register the car. **PFT-000** (Which

became known, after running in, as the ***"Pretty Fast Truck"***) was all ready to go, so off home to fit the plates and registration sticker and my car was ready for the road.

A condition for warranty cover required the car going to Leyland Australia at Wacol, for inspection and pre-delivery. I arranged to take the car to Wacol and drove up next day. Arriving at the gate a surly security guard told me *"only staff can drive on to this site"* and wouldn't let me in, suggesting I just leave the car with them. I made an excuse about arranging a later time and drove away for a while, (about morning tea-time) then changed into a pair of white overalls drove back saw a different security guard, so thinking at "Security Guard level", drove slowly up to the gate waved and drove thru; then I had to find the workshop.

The mechanics were not aware that I was coming either and they were busy with a Mini Gearbox so we had a little problem to solve. I suggested that if they told me what had to be done I would be happy to do it myself. This turned out to be very simple as I had already checked the car carefully before taking it to Wacol and so far everything worked as expected. So we put it on the hoist to inspect underneath. All was OK except for a couple of exhaust brackets which were bent and were easily fixed. So the staff gave me all the solvents, rags etc. and I set to work removing the heavy and now very grimy shipping wax. Once that was done more paper to sign and all was mine, just run in for 1,500 miles and take the car to Howards Motors for the 1st Service and any warranty work required. Two days later I lost the top layer of skin from my hands, strong solvents, and I never considered taking gloves.

I ran the car in over 2000 miles and found that the car understeers badly on slow tight corners but gets better at highway speeds and steered quite well on fast open roads. One day on my way home, down the back road from Mt Cootha (I worked at Channel 0), I forgot that I was driving the ***'C'*** and turned into a tight right hand bend like I had for years in the ***'B'*** and suddenly discovered chronic understeer, the only cure was to straighten up and brake hard luckily not hitting the bank, then proceed with much less haste.

All the myths about increasing power etc. do not work with the ***'C',*** it just understeers even more and goes straight ahead. One early press comment said the ***"The 'C' goes like a bullet and steers the same way."*** This was an accurate description, with my car, after years in the ***'B',*** it was a real and dangerous trap changing into a ***'C'.***

A drive to Mt. Buller (Victorian snowfields) followed the running in period and showed what an enigma the ***'C'*** was compared with it's smaller brother. The car was very smooth and quiet (except for the extremely noisy fan), flexible in traffic and able to purr away in 4th at 1000 RPM without fuss, but no low end torque or high end power. Able to cruise effortlessly at 4000 in O/D (108 MPH); good high speed stability and cornering but terrible understeer, at slower speeds, where any lock was required. Maximum speed of 120 in both 4th and O/D, economy on trip of 22.5 MPG and around town 17.3 MPG. The first standing ¼ mile time [Lakeside] was 17.9 seconds not as good as my "B" [17.58 @ Lowood]***;*** not good considering the extra 1100 CC's.

With a car the same shape as a ***'B-GT'*** this said that the motor was not as efficient as the ***'B'*** engine, the little extra power being used to overcome the greatly increased mass of the ***'C'.*** The other strange thing about the car was that when O/D was engaged the car leapt forward but when O/D was disengaged the car physically slowed down then slowly built up revs again. In one of my books on the "C" is a wonderful comment, "The engine must have been designed by an Ex-Naval Diesel Engineer who was transferred to a Tractor Factory, against his wishes

The maintain your interest here are some technical details of the **C** series engines compared with the **B** series as fitted to the ***MGC*** and ***MGB.*** Both engines used the same cam profiles and shared the same cam lift and rocker ratio, giving equal valve lift; there are small variations depending on which Workshop or Tuning manual you read. Nothing is all that accurate with **BLMC** publications. (***Bloody Lousy Motor Corporation?***). The combustion chambers were by Harry Weslake and very similar for all **BMC/BLMC** engines of the era.

Cylinder capacity of the ***'C'*** is 485 CC's and the ***'B'*** 450 CC's, same stroke different bore. The ***'C'*** has valve head diameters about 15% bigger than the ***'B'*** but the cylinder capacity is only 8% bigger. The ***'C'*** is fed by two 1.75 inch SU's and the ***'B'*** by two 1.5 inch units.

From the above it would be reasonable to expect the **'C'** to perform similarly with the ***'B'*** and with the bigger valves to breathe better and be more effective than the ***'B'.*** On a ratio of capacity between the engines the ***'C'*** should have produced 152 BHP and 178 Lbs/Ft not the claimed 145 & 174 figures the sales and factory data said.

In fact the ***'C'*** actually produced a lot less than 124 BHP (when installed in the car, with the normal exhaust system fitted) and at lower revs 5250 "V" 5400 and peak torque was 300 to 400 RPM higher (depends on which manual you read) all indicate that manifolding was hopeless and poorly designed, if it was actually designed at all, with the ***'C'*** and together with the massive truck flywheel and a fan that used 12 BHP at 5000 RPM [Data from Kenlowe fans in UK] made the ***'C'*** feel so different to the ***'B'.*** As will be described a correctly designed inlet and exhaust system along with a 25% reduction of flywheel mass plus replacing the fan with a thermo/clutch unit transformed the ***'C'*** into the big ***'B'*** that it could have been from the start. It sounds and feels totally different as well and it actually goes very well now.

The introduction described taking delivery of a new and largely unknown car and finding out how different it was to the **MK1'B** in characteristics, (not a pleasant experience) . Now I will outline work done on the ***"huge lump of el-cheapo cast iron"***, which **BLMC** considered a new engine. [Circa 1930's based on a 1926 Chevrolet 6 say some historians?]

Morris Engines Branch had a very bad habit and reputation of making very poor performance 6 cylinder engines, from the very early days of the company, except for those modified & tuned by Abingdon and Downton Engineering.

On one of our interstate trips (**MG Qld. Club** members) we went to Silverdale Hillclimb, as spectators, while there I asked **Paul England (a well known dynamic balancing engineer from Victoria)** to take the ***'C'*** for a drive and see what was wrong with it. **Paul** came back and said the engine won't rev because the flywheel is excessively heavy. This explained the strange overdrive action.

On return to Brisbane a decision was made to remove the engine (16,000 miles) pull it down and have a critical look within. We were still waiting for the workshop manual.

The first thing we noticed was how clean pistons 1 & 6 looked compared to the others; it seemed little mixture got to 1 & 6. from later experience they certainly did not do 33.3% of the work. The flywheel was indeed very heavy, OK for a heavy slow revving Light Truck. With the redesign of the old 4 bearing **C** series engine it seems Morris Engines lost the plot. Stuck in the 1920's/1940's mind set, after all it was "Good Enough for Grand-Pa". The earlier "C" Series engine head was about ¾" taller and had much better inlet port design so may have produced the claimed 145 BHP in the Healey 3000.

The reason for making the new engine was to power the coming **AUSTIN 3 LITRE,** an ugly, giant version of the **AUSTIN 1800** with a north-south engine driving the rear wheels. This required a smooth engine for the new saloon car. Abingdon got stuck with this exceedingly dud and totally under developed archaic and poorly tested engine.
NOTE: The **MGB** & **MGC** share cam timing, cam lift, rocker ratio and therefore valve lift. The ***'C'*** has 9:1 C.R., the ***'B'*** 8.8:1, which would indicate both engines should feel similar but not so; the ***'C'*** feels and sounds entirely different from the ***'B'.***

It was considered that about 25% of the flywheel mass could be safely removed (cast iron, not steel). The engine balance was poor, [Normal for BMC engines of the time]. This might be the reason for the truck flywheel. The press people commented on how smooth the new **C** series engine was compared to the 5 bearing **B** series engine and the superceded **C** series engine as fitted to the **Healey 3000 well known for being rough and crude.**

So 25% of the flywheel mass was removed and the motor fully balanced. We discovered that the piston crowns were .020 inch below the block face and as the head was being worked on by me we thought it worth while to lower the block face .018 inch to try and improve combustion. The ***"warranty supplied",*** correct valve guides were fitted and the motor reassembled. I cleaned up the head to be similar to the head on my 'B'.

NOTE: The originally fitted valve guides had the groove to retain the seals in the wrong place so that the seals came off and indeed acted like oil pumps for the inlet valves. No wonder the press cars all had plug fouling. These seals still come off. Later I will detail a good fix that cures this oily plug problem.

A noticeable improvement in driveability resulted, the engine pulled better and changed revs more like a **'B';** and the overdrive now operated as it should have from the start. Economy improved and the flexibility remained unchanged, all up a big improvement but well below what one expects from a 3 Litre car. Now you can buy an Aliminum flywheel for a "C" from tuning specialists in the UK. "C's" in the UK now put out up to 238 BHP.

About this time I read an article about *Downton Engineering Works* who had a long history of working with **BMC** and particularly **MG;** in fact all the heads from Special Tuning were done by *Downton* . This company were also involved with the development of the **MGC** competition engines as fitted to the *Le Mans and Sebring* cars **(MGC-GTS). I don't know but possibly Downton developed their mods. for the proposed Healey 3,000 MK 4, as they had all the performance data long before the car was ready for production and had developed the exhaust system and inlet manifolds. The Healey would have needed something to separate it from the "C" apart from a Grill change. It all became history when Donald Healey refused to sign off on the new Healey, but the tuning kits were sold directly by Downton and towards the end of production were fitted to a few cars from University Motors.**

Downton had developed two tuning kits for the production 'C' long before University Motors came into the picture. Kit 43 which retained the existing inlet manifold (reworked) an exchange head and completely new extractor dual exhaust system & Kit 45 the same except that the ***"Metters Gas Stove"*** type inlet manifold is scrapped and replaced with 3 fabricated tabular steel manifolds plus the very necessary 3rd SU; the additional front SU having a short neck to clear the bonnet. This I decided was the only way to go, as the *Downton* head produced 174.6 nett BHP @ 5500 RPM. at the flywheel, (The dual exhaust system contributes at least 20 BHP as part of Kit 45. in a letter from Downton).

Being my only car, it was impossible to send the head to the UK on exchange, I asked *Downton* if they would supply Kit 45 without the head. Understandably they were not all that interested; but also appreciated my difficulty and agreed to ship, but not guarantee the results. The eagerly awaited kit duly arrived and instant activity followed, during the next weekend. The difference was quite surprising (even with my enthusiastic but amateur headwork) now the engine started instantly and pulled when cold and had a lot more low end torque, it revved easily and developed high end power running to 6000 without fuss. *Downton* advised that they regularly ran these engines to 6000 RPM. To add confusion the Workshop manual lists valve crash as 5500 RPM, maybe this is why they quote max, power at 5250. ***NOTE:*** Apparently early factory engines were fitted with weak valve springs. **NOTHING WOULD SURPRISE ANYBODY ABOUT BLMC IN 67/68.** This information was supplied by Downton.

I was so surprised with this change, all the well noted problems had disappeared, so I asked *Downton* if they could supply a head. They agreed to get an **Austin** head and re-machine it. (MG & AUSTIN heads are identical except for the colour, Greenish for the "C" and black for the AUSTIN).

At the next sprint meeting at Lakeside the "C" did a 16.5 seconds standing ¼ mile, on well worn Olympic GT tyres which were awful, lots of wheelspin, C.F. 17.9 previously. (I never got the opportunity to time the car with the Downton head fitted, it would have been quicker).

This head was fitted as soon as it arrived and I immediately noticed a big lift in low end torque, particularly over the rev range where this engine runs as a day to day car, my head was similar in the higher ranges but sadly lacking down low by comparison. The most noticeable difference was fuel economy 28 MPG on a fast trip 25 MPG overall town and country use; a lot better than the original 22.5 and 17.3 figures with the original car. On our Wednesday runs we often average up to 30 MPG, With SHELL "V' Power and Michelin 185/65R15 ENERGY XM1+ tyres on 5.5 inch Minator alloy wheels.

The propellor, sorry fan, was the next item for attention. All the press had commented on the very noisy fan, and they were dead right. A change back from 4th to 2nd in traffic produced a roaring noise that drowned out all other engine noise, again an article in a UK magazine suggested a Kenlowe thermostatic fan could reduce the noise and let the wasted power drive the wheels. Kenlowe advised that the fan used 12 BHP @ 5000 RPM, it certainly seemed to be correct with the very short fan belt and alternator bearing life I was experiencing. A lot of engine power went for no useful purpose. I fitted a Kenlowe designed for the **'C'** in the UK, great no noise, good until a heavy traffic, heat soak situation then the fan could not cope with the Aussie summer, the other problem is the tiny little alternator of 34 amps capacity (less 10% in our climate) but only with the car running at 3000 RPM (which is 81 MPH in O/D), the alternator had the wrong size pulley, surprise, surprise, so at legal speeds an electric fan would only work with an appropriate size and speed alternator; scrap the electric fan and ponder for a few more years.

The solution for the power wasting fan is simple, fit a thermoclutch unit as used by **BMW's** for years. This requires very little machining and fits perfectly in the normal fan shroud and unless pointed out most observers don't even notice the change. The advantages are many, dead quiet, plenty of air in traffic and low speed use, stable idle and no power wasted at cruising speeds. (This change will be detailed later).

Since this information has been dispersed far and wide Ian Hobbs from the Adelaide "C" Register has checked around for a cheaper clutch fan and discovered that the hub from a "VL" Commodore with a Nissan fan fits very well with minimum modification to the "C" water pump hub. Ian got the parts from the wreckers for about $50. .

Data from *Downton* said that the factory figures for the **'C'** engine gave 123.7 BHP at the flywheel with all engine ancillaries fitted but with a much less restricted workshop exhaust system. *Downton* 's own figures were obtained with all ancillaries fitted, and their exhaust system. Motoring writers who tested a **'C'** with ***Kit 43*** fitted pondered how a **'C'** with 149 nett BHP @ 5500 RPM could accelerate and pull so well when the factory car supposedly produced 145 nett BHP @ 5250 RPM. Their conclusion was that the Factory figures were probably optimistic, [actually extremely optimistic], which explains the 17.9 second ¼ mile.

We now realize why the **'C'** was such a ***LEMON,*** it managed less than 124 BHP in reality, no wonder the *"press"* could not explain why the ***Big Healey*** felt so much stronger; all sorts of ridiculous reasons were offered including additional friction of 7 bearings ***'V'*** 4 and excessive windage from the new crank. No doubt the new engine had greater losses than the early unit but not 20 BHP, I believe the ***Morris Engines*** people just completely stuffed up the manifolding, probably never understood it anyway, still living in the 30's. Several books have mentioned that most of the problems with the "C" are manifolding and the flywheel mass. The standard 'C' inlet manifold has 2 capillary drain tubes fitted. Just in front of each SU with a dimple in the manifold to collect the pooled fuel. **Bloody great design that is, I have never seen drain tubes on an inlet manifold, before or since.**

Kit 43 gave a torque figure of 170.5 Lbs Ft @ 3000, less than the factory sales figures but more than the actual torque of the production car. A comparasion of data from the **'B' & 'C'** is interesting, the **MK 1 B** has a **BMEP** ***(Brake Mean Effective Pressure)*** of 152 @ 3,100 RPM. The ***Kit 43*** **C** has 145 @ 3000; one can only guess what the standard car figure was, probably much less than 140 @ 3400/3500 RPM. No wonder the **'B'** is such a good car. A **MK 1 B** gave 52.84 BHP/Litre (from **MGB** special tuning manual); the standard **C** 42.5 BHP/Litre; ***Kit 43*** gave 51 BHP/Litre and ***Kit 45*** gave 60 BHP/Litre and a **BMEP** of 161 @ 3000 RPM, Power as said of 174.6 BHP @ 5500 RPM and torque of 190 Lbs Ft @ 3000 RPM. ***Kit 45*** gives an increase of 41% over the standard car; this really improves the response, economy and efficiency of the engine.

The **MGC – GTS** alloy headed engines with 3 dual throat Webbers, big valves and cam produced 200/210 BHP @ 6000 RPM so the engine was certainly capable of very impressive performance with long life and reliability in long distance races. MG Motorsport (Doug Smith) can now supply "C" engines with triple Webers with up to 238 BHP.

Downton provided either 9.5:1 or 9.3:1 C.R. heads, I ordered mine at the lower ratio and with my block work ended up with 9.46:1. Pump fuel of course could not cope with this compression, (it was not even OK at 8.8:1 **MGB** C.R.). BP Nundah had a BP100 pump so all was well for many years; when this closed down the car ran on 100/130 avgas (equivalent to 104 RON when used in a car) which was much better, except that the car was restricted to a maximum of 150 miles from home (300 miles per tank) plus the problems of 44 Gallon drums. Knowing that fuel quality would only get worse (98 then 97 then 96 RON) I reduced the C.R. to 8.6:1 to run on current pump fuel. Shell "V" Power is rated at 98 RON and is ideal with 8.6 or 8.8 CR. No pre-ignition at all with correctly set timing, at high temperatures. [If I had of known about retiming the distributor for modern fuels, as we have it today, I could have left the compression unchanged.]

In 1986, it was time for a full pull-down and look see. Maximum bore wear ¾ inch down the bores was less than .001 inch not bad for 53,500 miles fairly hard use; the bearings were fine and the little end bushes well within factory spec., so this is a real long life engine (now 122,932 miles on 9 Feb. 2011) The pistons were not well due to carbon build up behind the rings, which had caused the ring lands to wear, caused by the bad design of valve guide seals and the earlier problem of incorrectly machined valve

guides (it was really hard to retain one's sanity with a **BLMC** 67/68 car, no wonder they don't make cars now).

NOTE: The **'C'** engine has dry fit cylinder liners despite what the *"experts"* (drips under pressure) say, this explains the very low bore wear. Knowing how marginal a **'B'** was (8.8:1) on pump fuel, we decided to reduce the C.R. to 8.6:1 this was achieved by machining the new standard piston tops down .060 inch over a diameter equal to the active combustion area, then balancing prior to re-assembly. The bores were very lightly flex-honed with a 280 grit hone, to allow good bedding in for the new rings; oil consumption is about 1.5 Litres/2000 miles at present. What I would have liked to do with the pistons was to dish the tops the same as standard **MGB** pistons, I believe this design may give the **'B'** its good low speed torque.[Motor Cycles with concave pistons had better torque at low revs than those with flat top pistons].

I was surprised how much happier the car was in normal traffic use and day to day driving, and while acceleration was down slightly the car was now used everywhere not restricted to out of town use. The lesson here is that most cars spend 75% or more of their use mixed in with general traffic and it is here where opinion is formed about what a car is like to live with 'day to day' and do we keep it or sell it. As the **'C'** arrived we all knew that it should be much better and probably could be made into a good **GT & Sports Car**, but many times I wondered if the pain would be rewarded with effort, time and money; today I am pleased that I did not sell it and now it's a retirement hobby, Fully insulated and air conditioned with tinted screen and windows, a great GT car.

I now run the car on "V Power" as the head has hardened exhaust valve seats. Valve clearances have only changed .001 to .002 of an inch over last 40,000 odd miles when the major pull-down took place. When I removed the head, in 2007, the exhaust seats were done to run ULP and the distributor was retimed to correct the timing and be correct for modern fuels, what a difference to the low and mid-range torque with the distributor correctly timed. All 60's cars need their distributors retimed for current fuels, greater mid range torque and better economy.

A question for our technical readers. Why didn't you change the cam? ***Answer :*** The cam is the same as the standard **'B'**, which as outlined in the last paragraph is very suitable for everyday use, of greater importance is the gearing of the **'C'** which runs at 2350 RPM in O/D 4th @ 100 KPH. The car would fly with a wild cam but it would always run below the cam, idle like a tractor and be an absolute pain in traffic and day to day use, exactly the opposite to what we have achieved.

Now we look at why the **'C'** handled so differently to the **'B'.** When the car was released to the *"press"* lots of clever comments appeared in the UK magazines, one of the most remembered being *"The problem with the **C**' is to get it to go around anything".* The press cars were supplied with low and equal tyre pressures for the roadster 24PSI, this certainly exaggerated the handling problems. The **'C'** needs 3 or 4 PSI increase in the front tyres; preferably 36 PSI front 32 in the rear for the **GT**. With our car on 185/65 XM1+'s Michelins and our suspension settings 36 front and 32 rear gives slight oversteer 36/33 slight understeer and 36/32.5 neutral. [Still the same with the Hoyle IRS fitted] I think we might

be getting somewhere with the handling and driveability. What a pity the factory were not allowed to develop the car properly before it was put on sale, or even prepare it properly for the Road Tests. They really were absolutely hopeless in 1967/68. Even in 1969 when they revised the car they gave the press the original cars, surprise, surprise, the press found no difference. Maybe a "Triumph" management plot.

Like the engine the handling was also an *'enigma'* excellent ride, very stable and comfortable with good roadholding; but a strange combination of heavy understeer at low speeds with acceptable handling at high speeds, this is for the **GT** with much better weight distribution than the roadster.

To compensate for an extra 220 Kilo's (roadster 'V' roadster) tyres were uprated to 165/80 series with 15 inch wheels & 5 inch rims. The **'B'** equivalent was 155/80 tyres on 14 inch wheels and 4.5 inch rims. Both cars were under tyred even in the late 60's. 10 mm extra tyre width to carry a heavy and nose heavy car just defies logical thought. The **'C'** should have had at least 185 tyres on 5.5 inch rims, preferably 195 mm tyres on 6 inch rims. To put this in perspective a **1990 BMW 318Is *(same weight, 1165Kg, as my C-GT)*** came with 195/65 HR14 tyres on 5.5 inch rims and it handled extremely well; this car came with gas shocks and roll bars front and rear and was a superb drivers car straight out of the dealership. This was the only car that I never needed to modify as it was correct from the start. An absolute pleasure to drive anywhere, anytime, pure good fun.

Weight distribution for the **'B'** or **'C'** models in % follows**:-**

'B' roadster, front 52.5 rear 47.5;
'BGT & V8', front 50 rear 50;
'C' roadster, front 55.7 rear 44.3;
'C – GT' , front 54.1 rear 45.9.

So the **'C – GT'** is a little better than the roadster but a long way behind the **'BGT'** which is evenly balanced with both engines. I was recently reading a Road and Track article on three German sports sedans and two of them had similar front to rear weight ratios to the "C GT" and all handled extremely well; so weight distribution is not the problem it was stated to be in the late 60,s, but Roll Bars were not well understood then and low aspect tyres were still in the future. [GM wanted to charge USD100 per car to fit roll bars, they held the patent this stopped other manufacturers from using them as a matter of course, until GM relented].

The *"press"* decided in their infinite wisdom that the real problem was the weight of the **'C'** engine **'V'**s the **'B'** and that the only solution was to move the engine back into the heater area and rework the bulkhead. Abingdon realized this only too well when they found out that the new engine was a lot heavier than planned [at least 70lbs]. So the weight distribution and handling was compromised and this coupled with a 1930's engine design really stopped the **'C'** being the successful big brother to the still very popular **B & BGT.** The **Rover** engine should have gone into the "C" as the chassis, suspension & brakes are much better than the "B"for a high speed touring car.

I re-read, recently, the weight distribution of the MK-2 3.8 Litre Jaguar which people still regard as one of the best sporting sedans of the 60's, Front 58% Rear 42%. The motoring press were

not then concerned about weight distribution, or were more used to heavy engines and were not comparing 4's with 6's in the same basic package. The Porsche 911 has a front to rear weight distribution about the opposite of the Jaguars and they seem to satisfy the critics.

Road & Track (USA) printed a superb definition of handling: - *'When you are enjoying yourself and your passenger is nervous; that is oversteer. When you are nervous and your passenger is relaxed; that is understeer', VERY WELL DESCRIBED.*

Now back to the story, the solution was relatively simple once we knew what to do, 30 years ago this knowledge belonged to serious motorsport not to our young **MG** car club members. Back in the 60's we used to go to Club sprint meetings at ***Lowood*** and later ***Lakeside*** for Standing ¼ mile; Standing lap and Flying lap events. These were good fun days with lots of enthusiasm but not much skill, we learned more what 'not to do' rather than 'what to do' with our driving techniques. Kerry Horgan once said to me at Lowood, "That's 4 out of 4 wrong, let's not make it 5 out of 5".

The **'B'** was a lot of fun particularly at ***Lowood,*** if you went off you disappeared into tall grass with no cement blocks or armco to damage your car; just roars of laughter from the mob. When I took the **'C'** to ***Lowood,*** what a surprise, it certainly was no **MGB** just a strange handling machine unlike any **MG** that I had previously driven. Very pronounced understeer, lots of body roll, lifting rear inside wheels etc.. In 78 miles the right front tyre lost ½ the tread depth over the outside ½ of the tyre; so it was obvious that we had a big handling problem but what to do about it was beyond us at this time.

After the straight was an acute left hand turn followed by a big flat paved area,(Lowood was an old WW2 airstrip) we tried to apply power thru this area while turning with the front ploughing, while at the rear the inside wheel lifted after finding the travel limit of the rebound strap and then hit the bump stop on the other side with a wild rear slide that did not respond to correction but produced an equally wild slide in the opposite direction, meanwhile the front just ploughed on (I was glad that I was inside and not outside looking on, it would have been terrifying.) some of our instructors tried to sort it out but to no avail.

The only way to correct this situation was to straighten up and brake, then try again. We now know what the problem was; the rear rolled until the axle reached the rebound strap on one side, then bottomed the bump stop on the other side and so the wild slides, back and forth etc.. Tim Harlock [designer and builder of the Centaur Sports Car] explained why, many, many, years later. People still do not understand the operation of roll bars, Tim does.

I reluctantly accepted the journalists explanation and just learned to live with the ***Pretty Fast Truck.*** At ***Lakeside*** a good **'MK I B'** could lap in about 1 min 18 sec; the best I could manage in the **'C'** was 1 min 26 sec; some 3 Litre sports car. The ***Carousel*** was an experience to avoid and I had to back off for the ***Dog Leg.*** Now the car manages (an old very hard 175/80 Michelin ZX's which are 2% bigger in diameter and raise the gearing to 27.49 MPH/1000) 1 min 22 secs, 4 seconds better than when I was much

more enthusiastic i.e. younger; a more competent driver turned in 1 min 17.6 secs on the same tyres. John Fraser suggested that with a set of new tyres it would probably lap up to 3 seconds quicker; with Lakeside a distant memory I can only guess at how it would perform now.

Many years passed and my mechanical engineer friend said *"what that car needs is some roll stiffness, not by heavy springs but by correct roll bars front the rear".* About this time I had read all about the Light Alloy bodied competition **'C'**s with 7 inch rims flared guards etc., all the drivers commented how neutral the handling was and how good they were to drive; tucked away in the article was a mention of a **Mini Cooper** rear roll bar plus telescopic shocks all round, so my interest was awakened. In practice the rear roll bar was not fitted to the factory GTS cars. There is some dispute on this some say they were fitted and others say they were not it depends on who is telling the story.

Various people in the UK commented that the **'C'** was much better on the heavier ***"police"*** springs plus Koni shocks all round; the police vehicles had heavier springs to compensate for the [then] heavy radio equipment carried in the rear of the car. I discussed this with my friendly engineer and he commented; *"Heavy springs increase roll stiffness at the expense of ride and roadholding. On our roads, the standard springs are OK but roll stiffness needs attention., Most people, including some [in the UK], do not understand this. They should study the 1930's BMW 328 roadster chassis and suspension.*

By this time I had fitted a full set of Koni shocks and found a great improvement with the car, particularly the rear (I will cover this in article 4 as it applies equally to all **'B'**s). I enquired about roll bars locally; one *"expert"* said rear bars don't work with the **'C'**, what worked was a 1 inch front bar but it tore out the mountings so required special heavy mountings. I thanked him for his advise and decided to look elsewhere. I have recently modified my front Roll Bar chassis mountings by adding .080" mild steel plates; pop riveted to the chassis and tapping out the existing 5/16 nuts to 3/8 UNF to distribute the load properly to the chassis rails. The chassis mountings were flexing and after 10 years with the 7/8" roll bar had developed cracks between the mounting nuts in the chassis.

I should mention what made fixing the **'C'**s handing so necessary. In mid 1990 I bought a **318Is BMW** which came with German **M-Technik** suspension, and it handled better than any car I had ever driven. To a driver brought up on **MG'**s this was a *"Whole New World"* and really said that something had to be done to my **'C'.** Both cars weighted 1165 Kilograms; why was one superb and the other absolutely *'bloody terrible and frightening on occasion'.*

In *'Classic & Thoroughbred Cars'* I noticed a **'C'** handling kit from ***Ron Hopkinson*** **MG *Spares*** in the UK. Faxes confirmed that they had a 7/8 inch front roll bar plus a full set of Bilstein Rally shocks and this gave a great improvement in handling. I faxed back to ask if they had a rear roll bar for the **'C'.** The reply was that they did not, but that they had a 5/8 inch rear bar for the **'B-GTV8'.** I could not see why a rear bar would work well on a **'BV8'** but not on the **'C-GT' as from the centre point they are exactly the same**, so I ordered both roll bars, *'suck it and see'*. Back came the reply that they would supply the rear bar but did not recommend fitting it to the **'C'.**

NOTE: The **'C-GT'** with 222 extra Kilo's and a weight bias of 5% (**C 'V' B**) to the front has a front roll bar just 1/8 inch thicker than the standard (optional, originally) **'B'** roll bar. It is now obvious why the **'C',** particularly the **GT** with more up top weight, had so much body roll. The **MGB** roll bar is 9/16 inch; the **MGC** roll bar is 11/16 inch and the Special Tuning roll bar for the **MGB Roadster** is 5/8 inch.

Just before X-Mas 93 a card in the post said my parcel was here; so off to the Post Office and back with my roll bar kits. On X-Mas day I removed the standard bar and went for a slow drive around my suburb, what a surprise the car was absolutely hopeless, swinging the wheel between 20 to 4 and 10 to 3 produced a lot of noise and great amount of body roll but almost no change of direction; *"Oh, What a Feeling"* but not as in the **Toyota** ad..

Back to my workshop to fit the new 7/8 inch bar and then repeat the drive. Now it was *"as the Pom's like to say"* completely different, the car swung from side to side with little tyre noise but rather heavy steering. After lunch I drove over to Toowong to let my mechanical engineer friend have a drive (he knows a lot about suspension systems but says very little) a slow 25 to 40 KPH drive around the suburb produced this comment; *"That's better now fit the rear bar and that should further improve the turn in and lighten the steering as well".*

Bright and early on Boxing day I opened the fitting instructions for the **'B-GTV8'** roll bars and the opening sentence read; ***Quote :*** " Remove the existing anti-roll bar." ***Note:*** "Before commencing to fit the handling kit check that the car is already fitted with a front anti-roll bar, if not a fitting kit will be required". Good old BLMC again, a "B-GTV8" without roll bars must have been fun in the rain, to say the least.

So on to the rear bar section of the instructions. The bar mounts in front of the fuel tank under the boot floor, with the ends going forward over the axle then by push/pull rods down to the bottom spring plates. This is very neat and almost impossible to see.

Because the **'B'** has narrower brakes than the **'C'** the ends of the bar just touch the heads of the bolts for the brake backing plates. This causes no fouling or noise in practice; the only modification required was to slot the bolt holes in the supplied mounting plates slightly to allow for the 1/8" width difference at each end of the bar to be accommodated.

A test drive showed we now had a very different car, turn in is good, not a modern 3 Series to be sure but a huge improvement on how the car was when it left Abingdon, in 1968. The steering was now lighter and much more direct even allowing for 3.5 (actually 3.45) turns L to L and 34 Ft turning circle (the **'B'** has 2.93 turns and 32 Ft for comparison) so off to Toowong for comment. *"That's much better, probably would be even better with 1/16 inch smaller diameter bar on the rear or a little thicker on the front as now it oversteers slightly."* Imagine a **'C'** that oversteers; having grown up

with a **'TF'** oversteer was normal and not what I considered a problem, what terrifies me is a car that will not respond to the ***"Helm"*** and heads for the scrub.

Since I wrote this series Tom Pugsley from Canada has brought in a 2.875:1 Quick Rack; rack and pinion for my "C" from MGMotorsport in the U.K. approx AUD400 if you bring it in yourself. Tom has fitted this kit to his "C" roadster and assures me that it is well worth doing. With my Moto-Lita 15.375 inch Wheel instead of the 16.625 inch original this will give a rim movement almost the same as my MK1 "B". I have had the Quick Rack fitted for years now and it is a big improvement, the steering has some feel to it and you can feel it load up unlike the 3.45:1 standard rack. This was a strong criticism of my mechanical engineer friend who commented that as you could not feel the steering you would not get advance warning when the steering started to lighten as in slippery road conditions. The Quick Rack is 2.875:1. The MK1 "B" 2.93:1 both with the ginormous 16.5 inch wheels (the "C" with leather cover) With the 15.375" Mota-Lita wheel the steering is about the same muscle wise as the car on original skinny tyres. I find that most sporting sedans with power steering have a steering ratio of 2.9 to 3.0 so the MGB was always about right. More than 3.5 turns is for the family shopping trolley class.

I now have MINATOR 15/5.5 inch center lock alloys fitted with 185/65 tyres and have minimum clearance from the widest part of the sidewall to the turn in on the rear wheel arches of 11 mm on the right and 12 mm on the left. This is fine in practice and nothing rubs anywhere. 195 section tyres are 12 mm wider overall i.e. 6 mm less clearance or only 5 mm right and 6 mm left which even if a panhard rod were fitted would require turning up the wheel arch edges to provide a safe running clearance. There is no problem at all with 185/65R15 tyres.

The **'C'** and the **BMW** handled in a similar manner and interestingly both use a **3 PSI** pressure difference but the opposite way around, i.e. **BMW F30 R33** and **'C' F36 R32.5.** The **'C'** now goes around *Lakeside* with ¼ turn of lock rather than handfulls of lock when new, (standard rack). The final 'tweek' was to remove all the shims from the top **"A"** arms to see what the camber was (as it arrived the right front had ¼ deg negative and the left front ¼ deg positive camber) we ended up with –1.125 deg Left and -0.75 deg Right, with the lower wishbones horizontal i.e. parallel to the ground. Toe in (currently) set at 5 mm.

Like the problems with the early **MGA Twin Cam** once again Abingdon were forced to rush out a new model without sufficient testing or development in the field and once again a potentially good car was hounded off the roads by the reported problems and very bad press reports. Without spending money on the engine just a few Pounds Sterling would have given the car good shocks and both roll bars (which are necessary on a standard car with factory torsion bars and rear springs, after fitting a 7/8 front bar the rear bar really improves the car.) and transformed peoples impression of the **'C'** which might have survived long enough to get the **Rover** engine, which was almost available when the "C" was under development.

My car can now keep up with other **MG's** on Wednesday runs without heading for an instant ***"Off Road Experience"*** which as it arrived would have been mandatory. I fed

back my experience with the roll bars both on ordinary road work and on circuit training to *Ron Hopkinson's* people so that other **'C'** owners might benefit from our experience.

So after nearly 40 years of, bit by bit, development I now have the 3 Litre sports and **GT** car that I thought I was ordering way back in 1967. **Basically the "C" is a very good car, if it is developed as outlined in these articles, to make it how it should have been in the first place.** The **C-GT** is the better car for lots of reasons, it is stronger, with a much stiffer chassis, has better balance and as a high speed cruiser (no longer possible with the new draconian legislation in Australia) is hard to beat; and it is quiet, particularly when air-conditioned and fully insulated, thermally and acoustically.

This is the final part of this saga, it is of interest to **'C'** owners who do their own mechanical work. Included are items that will be of interest to **'B'** owners particularly the rear shock absorbers.

Any **MG Club** who has **MGC** owners may run this SAGA, if considered of interest to their members, or make photocopies etc..

(1) : THE BIG LUMP .

I mentioned the valve guide seals; these are neoprene rubber cups which fit over the valve stems and plug onto the valve guides, they have a raised bead inside the cup which is supposed to fit into a groove in the guide and stay in position. The caps come off the guides and work like oil pumps for the inlet valves.

This set up is totally different to all other **MG** engines. Early cars had the valve guide groove machined in the wrong place (what's new at **BLMC**) replacement guides were (or should have been) fitted under warranty; unfortunately the caps still come off. If you have oily plugs remove the rocker cover and have a look, you can see thru the springs if the caps are in position or not. The only good cure is to fit US after market Teflon/Steel Valve Stem Seals 11/32" Valve Stem & Valve Guide OD of .530". These seals fit directly onto the existing guides, a fitting tool and instructions come with the seals. These seals are available from Yank V8 Specialist parts suppliers.

If you are about to remove the head for any reason it would be worth changing the valve guides to bronze (Hidural 5). My head has bronze guides machined the same as the standard iron guides (tight press fit). The inlet guide for the "C" is the same as the exhaust guide for the "B". I got 6 new inlet guides locally, they were bought in for competition "B's". The exhaust guides are not the same as other MG motors as far as I know. You would have to get them made up.

In 1983 @ 53,000 Miles I did a full pull-down and after removing the main water gallery cover and the water pump felt thru the gallery to pump opening (out of sight) and felt a sharp edge; investigation with a torch showed a casting web that was only

about 2/3 open. This was not noticed during the original pull-down @16,000 miles The patterns used to cast the block did not meet up properly inside the gallery leaving a thin 1/16" web blocking the gallery behind the pump; a ***"Gorilla"*** in the foundry had punched a hole thru this web but not removed it. This gallery feeds the exhaust ports etc thru the head, no wonder the rear cylinders run hot under power. I have since found that this block restriction is QUITE COMMON and is well known by re-builders and tuners now.

ANY 'C' OWNER WHO HAS OVERHEATING PROBLEMS SHOULD REMOVE THE WATER PUMP AND CHECK THIS OUT.

I ground out this obstruction and no more water loss, water temp 165 deg F normal running; full power mountain work (which I happen to enjoy) runs the motor up to a maximum 190 deg F. in Summer. **Since I wrote this article two "C" owners have checked their engines and both had about a 30% obstruction and tended to run hot. Research by Ian Hobbs (S.A. Club) found a thermostat with an extension that closes off the hole below the thermostat which feeds the bypass hose to the water pump; about 20% of the total flow thru the pump. This thermostat required modification to the thermostat to close off the bypass also it operates at 180*F which is much too hot for our Queensland climate. The factory unit is 165*F for hot countries the same as the "MGB".**

Enthused by this information I did a bit of checking of thermostat catalogues and found a DAYCO DT13C-BP 160*F (used in an Nissan "URVAN" diesel) which on a quick measure looked like a chance. On measuring with the calipers it was better than a chance; it is directly interchangeable with the normal unit. With the thermostat shut the inverted saucer washer is 5/16 inch above the outlet hole, in the fully open position the washer sits on the flat casting with the spring compressed 1/16 inch totally closing off the bypass hose.

Before assembly I had the Block face and Head surface ground to flat, at U of Q Dept. of Mechanical Engineering, both were uneven. I usually change my coolant every 3 years and do not need to add water during this time.

To lighten the flywheel we removed material from the front face (engine side) tapering at 45 deg from the crank boss to about ½ inch deep then out about 2 ½ inches and tapered back to the clutch housing bolt holes, the details have been lost, this removed approx. 25% off the flywheel mass. Another method of lightening is to mill out the material between the clutch mounting bolt holes; I was advised that this can cause cracking in the flywheel, with use, unless the correct method of milling is carried out, so if you go this way check the machinist out very carefully as stress fractures may develop due to the machining method used. (I believe it depends on the type of cutter used, to cut out the holes).

I noticed while looking thru a ***MOSS Catalogue*** that they have a sort of copy of the *Downton Dual exhaust system,* also inlet manifolds for ***WEBER*** dual throat carbs;

this would go a long way to making the **'C'** into the big **'B'** that it is supposed to be, the only way to get this engine to perform properly without resorting to a wild cam and high compression is to address the manifold problem. Check " www. mgmotorsport.com" as they have the proper copy of the full Downton exhaust headers and system also the inlet manifolds for triple Webers; (bloody expensive unless you live in the U.K.).

The fan not only makes a bloody great roar but wastes a lot of power doing it (Later cars were fitted with a modified fan to overcome the constant complaints about excessive fan noise) and the standard engine needs every little horsepower it can get. A **BMW** fan hub adapter part # 11521259805 fits on to the water pump flange and pulley with a little machining of the adapter, flange and pulley then an early ***"3" Series*** Clutch thermal hub bolts to the adapter and a ***"5" Series*** fan (with the blades cut down 25 mm) bolts to the clutch hub and is a perfect, if a bit costly solution to the fan problem.(AUD300 @ the time) As mentioned earlier on a Commadore VL fan hub and Nissan fan can be fitted with very little machining. The VL used a beaut Nissan motor. [This will cost approx. $50 with parts from the wreckers].

In front of the air cleaner intake, [early cars at least] in the panel between the radiator and the left wing is a nicely formed hole a little bigger than the air cleaner intake, but covered with a plate [tack welded on]. This was probably to overcome the complaints that in cold countries the engine is excessively difficult to warm up, with lots of choke and related plug fouling. This tacked on cover plate should be removed, in our climate, to get some cooler air to the carb's and manifolds.

My car from day one had a ***"Made in Hell"*** type ***AUF 305 SU Fuel pump*** which over the years gave more trouble than you could ever imagine even from an **SU.** It failed twice in the 12 month warranty period. I never had any trouble with **SU**'s on the **'TF'** or the **'B'** just routine servicing. Finally I decided that I had had more than enough pain and looked for a modern pump that would replace the **SU** and mount in the same place. The answer is a ***Federal - Mogul Carter*** in line motor pump ***Part # Carter P60504*** available from ***'Progas Qld.'.*** This pump spec is ***2.8 PSI 30 US Gallons per hour, C.F. 2.7 PSI*** and may be (on a very, very good day) ***12 Gallons per hour.*** The Carter draws 1 Amp and runs from 7 Volts. Mounting is dead easy and the pump comes complete with inlet filter, hoses and mounting/wiring kit. The good news is that it is maintenance free {life of 5000 hours} and costs less than a diaphragm and set of points for an **SU**. This pump would work well in all **MG's** with rear mounted high pressure pumps.
Mazda fuel pumps are extremely reliable and service free in my experience and I suggest you check these out, any pump except an SU seems to be the way to go.

The transmission is basically good. There is 1 area to look at:-
If you experience gear lever rattle/vibration under power in 3rd it is caused by resonance in the shift lever. Nearly all modern cars have solved this by using rubber isolation within the gear lever. For the **'C' & 'Mk 2 B'** the easy answer is to remove the gear knob, nut and boot and slide a 75 mm long ½" I.D. piece of thick heavy hose over the lever (hidden by the boot) the best hose for this is

Trailer Brake Vacuum Hose. If you are handy with tools another good thing to do is get rid of the sharp nut under the gear knob; to do this remove the lever, take off the nut then cut ¾" off the threaded end (mild steel) and round off with a file, measure inside the knob for depth then carefully drill out the knob moving down bit by bit, until the knob screws over the chrome section for a nice non pressure fit; when you are happy use plumbers Thread Seal *(PTFE)* tape around the thread and position the knob. Result the gear knob is 0.875" lower, the sharp nut has gone and it looks and feels much better. The shorter shaft does not rattle (because of the higher resonant frequency).

(2) : FRONT SUSPENSION .

The front suspension can be a source of rattles, at low speeds on any road surface, the cause of which evades everybody and all attempts to locate the rattle fail. Our car had this problem with the left front from new, surprise, surprise, one of the first parts to run out after production ceased was, swivel pin & bush kits. When I finally replaced the swivel pin & bushes I found the real problem.

Factory clearance for the bush to pin is .0025" to .003". The special tool for reaming the bushes was probably set to give this clearance. The normal clearance for a 1" shaft running in bronze bushes is .001". The factory specification is designed to make a loose assembly; (possibly for grease access) don't use the special tool, have an experienced machinist ream the bushes to a minimum fit consistent with minimum friction & set the end play to minimum without being tight and all the rattle problems magically go away, use MOLYCOTE or similar Grease.

(3): STEERING.

In the steering column are 2 items for probable attention.

1: The universal yoke and bearings/cups are probably dry and rusty.

2: The steering column locates thru the rubber damper into the universal yoke. The end spigot on the shaft should be able to rotate (a few degrees) in the bush in the universal. Not in our car [deck cargo from UK] from 17 Miles apparently. I had to drive the shaft out of the bush to release it, all nice and rusty and little sign of ever being lubricated prior to assembly. The simple answer again is to replace the universal yoke bearing & cups which are readily available from bearing suppliers. Remove the shaft from the yoke, this will require some effort, Emery off the rust, ease out the bush to clear rust for a free rotating fit then use Molycote or similar grease to lubricate and water seal the bearing. Now the steering will be less inclined to rattle, and the steering will feel much better. (The rubber shock absorber can now operate as it is supposed to as it arrived it was it was a locked shaft.)

In September 2012 I installed the EZ Electric Power Steering unit. The column is made in Holland using a power steering assembly made in Japan by NSK (well known for precision bearings) this assembly completely replaces the factory steering column, from the universal to

the steering wheel. It has adjustment (via potentiometer) to set the power assistance to suit the driver and draws between 5 & 8 Amps only.
With the MG Motorsports fast rack (2.875:1) and 15.375" Moto-Lita wheel this works superbly, very light steering at parking speeds and normal power steering on the road. The steering characteristics are the same it is just no longer, MANUAL "ARMSTRONG" POWER STEERING.

(4): REAR SHOCK ABSORBERS & LINK ARMS.

N.B. THIS ALSO APPLIES TO MGB's. **T**he lever arm dampers are OK when new but don't stay that way for long, about 35,000 Miles on my **'C'**. When we replace these wonderful 1930's devices (which should only belong in the Science Museum) we don't carefully check the condition of the two important rubber bushes on the connecting link between the spring plate and the lever. There is over ½" free play in each direction by light hand pushing. On the car there is at least 1" of suspension travel with NO damping at all. Does your car jump about on ridges, ripples and little bumps? The best answer is to join the modern age and fit Telescopic Shocks, in the parts list you will find details of KONI part numbers. The rear shocks and mounting brackets are available, same on **'C'** & **'B'** the front shocks for the **'C'** are not stocked locally but are probably available in the UK. Bilstein and Spax also make shocks for the **'C'** available in the UK.

Since I revised this saga in 2008 I have discarded the "Cart Springs" and in August/November 2009 fitted the "Hoyle Engineering" IRS kit to improve the ride and comfort of the car as earlier in the year I acquired a pair of 2002 Mazda MX5 leather seats from a repairable write off. This was a smart and safe move as we now have protection from "Whiplash" as well as supportive and very comfortable seats. My wife is very happy as her back does not hurt now when on an all day club run.

(5): DIFFERENTIAL.

The diff is not a source of concern except for **'B V8's'.** The thing to look at is the roll pin in the Pinion pin, it holds the pinion pin into the diff cage. I was advised years ago that **'B V8's'** and Tuned **'C's'** can end up with crown wheel & pinion damage because the roll pin (very hard spring steel) can come out or split and if this gets in the works goodbye quiet diff. The answer is simple, remove the cover plate and fit a split pin thru the hollow roll pin; this stops it coming out. It is cheap insurance for all **MK 2 'B's,** and **C's.**

6): FRONT BRAKES.

Check your front hub disk mounting flanges for run-out, you might be surprised. If your disks run out by more than .003" check the hubs before replacing the disk. The left front hub on our car ran out .0025" causing the disk to run out over .005". This was only discovered when I replaced the disks with Brembo's,

run out on the left, good on the right; swap over the disks & still run out on the left.

NOTE: Healey 3000 MK 3 disks are identical to the **'C'** disks. The Brembo, spares for **HEALEY 3000 MK 3**, disks are a much better material, they don't rust and pock mark as badly under the pads when not used daily. The downside is that they tend to scream/squeal. Many **'C'**s have a tradition of noisy brakes.

The answer to brake squeal is to fit Turner Enterprises (USA) Part # SH 301-9 Brake Shim Kit, available from brake specialists, these are self adhesive shims that are cut and fitted to the pad backing plates. They work by reducing the resonance caused by the disk pads and the hollow pistons in the caliper. Keep the Stainless Steel shims which were fitted as new and have nice quiet corrosion free brakes. The brake pistons are hard chrome plated mild steel and though not leaking or causing problems will by now be very rusty. Easy answer, have them copied in Stainless Steel (not Expensive). If you do this you will need the Turner Shim Kit. Stainless pistons are more resonant than mild steel originals. If you use "Green Stuff" brake pads they are now supplied with 3M shim material.

(7): HANDLING & CONTROL.

From article 3 a lot can be done for not too many $'s to change the driveability of the **'C'.** With roll bars for the GT 7/8" front and 5/8" for the rear, (maybe 9/16" rear). For the roadster the 7/8" front with possibly ½" rear; too strong on the rear may cause oversteering problems. I have NO experience with the roadster so cannot offer any real advice.

KONI or similar shock absorbers should be fitted as a first step. In the Workshop Manual reference is made to fit shims (from memory 1/8") to the top **'A'** arms of the front suspension to allow for the bushes to settle. The bushes don't settle so the cars came with positive camber. In our car as described we took out all the shims to end up with -1.125 deg. on the left and -0.75 deg. on the right, fortunately this works out perfectly for our normal road camber and the car tracks perfectly (hands off steering, the car runs perfectly straight on a flat road) This not only improves turn in but lightens the steering and gives plenty of clearance for 185/65 tyres. Without removing the shims 175/80R15 tyres just foul the turn up in the front wings, so may foul with 185/65R15's on 5.5 inch rims. CHECK CAREFULLY.

The IRS with Ford disc brakes and Granada 3.64:1 has completed the car, handling is still to be determined on a circuit but so far is as good as it was and with a set of new tyres will probably be better. No rear roll bar seems to be required with the IRS for road use. The rear roll centre and spring rate seem to go well with the factory torsion bars and 7/8 front bar. The car is much more compliant with a reduction of 55Kg in unsprung weight at the rear. My wife weighs 55Kg to put this in perspective.

The 3.64 diff. with 185/65 R15 tyres gives a ratio of about 3.79:1 similar to the 1969 cars. Acceleration and applied torque have improved about 10% on the 68 car.

(8) : TUNING .

This engine is critical of being over-advanced, if the distributor has not been retimed, (pre-ignition around 3000/3500 RPM under load, i.e. Max BMEP.), the original advance springs in the distributor give way too much mid range advance. In *"SAFETY FAST"* magazine way back in 1968 was an article on this problem complete with the correct spring set part number.(Lucas part # 54419869) Try as I might I could not find any in OZ. The best I could do was have the existing springs adjusted (on a LUCAS distributor service machine) to as near as possible to the Workshop Manual figures. I feel that we are still not correct at midrange. This over-advance at max BMEP causes pre-ignition which can lift the head enough to cause water loss (sound familiar) so it is better to be slightly retarded at max RPM to protect the engine at Mid Range RPM. *Downton* advised that with the WESLAKE combustion chamber design, i.e. all BMC 60's engines, 0.5 deg too much advance is detrimental to performance and the engine; but you can be up to 4 deg from optimum advance without adversely affecting performance.

I strongly recommend that all "C" owners get their distributors retimed to firstly correct the wrong factory settings and secondly to set the distributor to run on the modern fuels, which require much less advance, most important at mid-range i.e. 2,000 to 3,500 RPM.

I sent my distributor to: Performance Ignition Services, PO Box 464, Nunawading, Victoria, 3131. Phone [03] 9872 3644. The owner is "Dick",who has run the business for 25 years. To rebuild and retime the distributor and fit electronic ignition is approx $240 + Express Post, both ways. They will also provide Inductive HT lead sets, for the "C" $70, these are reliable interference free HT leads unlike carbon leads which always lead to problems.
The original "C" distributor is over 10 degrees too advanced around 2,500 to 3,500 RPM. This is why they always were fuel critical and pinged at midrange.

[10]: AIR CONDITING AND INSULATING THE CABIN.

In 2006 I fully insulated the firewall, both sides, the tunnel except on the top under the console both top and inside, the floor and both foot-wells then installed a full [all new components] air-con system as we suffered de-hydration on a long interstate trip in 38*C temperatures and very low humidity. With a 25% tinted and banded windscreen and 3M 35% metallic film on the other glass [maximum legal tint levels] we got a lovely quiet and cool car. This is most unlike an MGC in our climate. We can drive it anywhere and always be cool and comfortable, all year round. There is a separate article covering the air-con system, it is too long to be included here.

(11) : PART NUMBERS for reference .

KONI front shocks 80-2053.
KONI rear shocks 80-1244 (Check **MGB** part number).

KONI rear mounting kit 6-320A. Same as **MGB**.
Fuel Pump FEDERAL - MOGUL CARTER P60504. Supplied by PROGAS Qld..
Top Radiator Hose REPCO RCH 613 (Falcon XM-XP 1964/66).
Head to Heater Hose REPCO RCH 1656 (Holden Barina ML 1986/88). Early cars only, later cars have the heater tap on the head and can use normal ½ inch hose.

THERMOSTATS. DAYCO DT13C-BP 160*F (Nissan Urvan Diesel) REPCO $23 inc GST.
Brake Shim Kit Turner Enterprises (USA) Part # SH 301-9.
Brakes "Green Stuff" EBC Kevlar type front EBC 2291 [now supplied with 3M shims] (late TR6) file out the pin holes to ¼ inch. Rear EBC S5135 (These are NOT the same as the Capri 3000 V6, this was incorrect information given to me by another self proclaimed expert, who didn't have a clue, many years ago).

Bruce Ibbotson. 27 January 2014.

P.S. Valve guide seals are USA aftermarket items to suit the Chev 350. These valve guide seals have the same stem diameter and the same guide diameter and fit easily to the MGC factory valve guides.